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ABSTRACT

Designed to introduce the reader to the main works in normal (nondeviant) child phonology available in English, this annotated bibliography includes 2 general readers on child language and 27 books and articles with primary emphasis on phonology. The annotations, intended to be primarily descriptive, summarize: the design of each study; its theoretical approach, where relevant; the nature of the data; and some of the results or conclusions. Items numbered 3, 6, 9, 21, 23, 26, and 28 represent major current theories on the acquisition of phonology. Articles that deal explicitly with aspects of general theory are 13, 15, 16, 17, 18, 19, and 22. Number 4, 7, and 27 are among the classic works reporting primary data; others are 5, 10, 11, and 25. Experimental data on particular aspects of phonological acquisition are found in 8, 12, 14, 20, 24, and 29. (Author)

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READERS, BOOKS AND ARTICLES ON CHILD PHONOLOGY: A SELECTED BIBLIOGRAPHY*

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Since 1965, when J. Sableski's bibliography on child language appeared (Linguistic Reporter, 7.2. 4-6), interest in this field has increased rapidly. That year also saw the appearance of Chomsky's Aspects; its recognition of the necessary relationship between a grammar's explanatory adequacy and its theory for language acquisition has greatly stimulated theoretical interest in child language. In addition to the linguists, developmental psychologists, educators and speech therapists are also among the researchers contributing to the expansion seen today in the literature. As a result of this growth, it is no longer possible to adequately represent the whole field in a single bibliography of reasonable size (similar to the 28 items listed by Sableski). Thus, the annotations which follow are devoted to a particular sub-field, that of child phonology. [Future issues of Linguistic Reporter will contain bibliographies covering other areas of child language (e.g., syntax/semantics, communicative competence, etc.]

Designed to introduce the reader to the main works in normal (non-deviant) child phonology which are available in English, this bibliography includes two general readers on child language, and 27 books and articles with primary emphasis on phonology. For a general textbook which includes a phonology section reviewing some of the basic issues and data, see: Paula Menyuk, 1971, The Acquisition and Development of Language, Englewood Cliffs, Prentice-Hall, Inc. Articles on child phonology now appear in several journals including the new Journal on Child Language (first issue May 1974). Although working papers are common in other fields of linguistics, the only one in child language is Stanford University's Papers and Reports on Child Language (Eve V. Clark, editor); these issues, half of which are devoted to phonology, contain mostly pre-final versions of papers, many of which are subsequently published.

Intended to be primarily descriptive, the following annotations summarize the design of each study, the theoretical approach (where relevant), the nature of the data and some of the results or conclusions. Items numbered 3, 6, 9, 21, 23, 26 and 28 represent major current theories on the acquisition of phonology. Articles which deal explicitly with aspects of general theory are 13, 15, 16, 17, 18, 19 and 22. Numbers 4, 7 and 27 are among the classic works reporting primary data; others are 5, 10, 11 and 25. Experimental data on particular aspects of phonological acquisition are found in 8, 12, 14, 20, 24 and 29.

READERS

1. Bar-Adon, Aaron and Werner F. Leopold (eds.). 1971. Child Language, A Book of Readings. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. [BALR]

Containing, in chronological order, 60 reprinted articles (15 on phonology) each prefaced with an editor's comments, this reader introduces the (beginning) student to two centuries of child language studies. The brief introduction includes references for bibliographies and literature reviews, and a topical table of contents. The first paper (by Leopold) reviews the field from 1850-1946. An appendix of termpaper topics is included but no combined index. (See particular abstracts below for Burling, Chao, Olmsted, Velten; and also Jakobson, Leopold.)

2. Ferguson, Charles A. and Dan Isaac Slobin (eds.). 1973. Studies of Child Language Development. New York: Holt, Rinehart and Winston, Inc. [FSR]

Arranged by content, the 41 empirically oriented articles reprinted here represent contemporary data (from twelve languages) on specific but representative topics in phonology (Part I, 13 articles) and grammar (Part II). The brief preface references available texts, reviews and bibliographies. Introductions to each Part discuss fundamental issues, and critical prefaces to each subsection relate the reprinted articles to issues and other research in the field. A combined bibliography is included but no index. (See particular abstracts below for Burling, Chao, Menyuk, Moskowitz, Shvachkin and Winitz/Irwin.)

BOOKS

3. Jakobson, R. 1941. Kindersprache, Aphasie und allgemeine Lautgesetze. Translated by Allan R. Keiler, [Child Language, Aphasia and Phonological Universals] The Hague: Mouton. 1968.

One of the most influential acquisition theories is that contained in this monograph. Here the author specifies a chronologically invariant sequence which derives from the premises that every phonological system is stratified and that the same structural principles (implicational relations) which determine the universal hierarchy of oppositions in phonemic systems will also determine the development of child language (and language dissolution in aphasia). The child's successive acquisitions of phonemic oppositions will mirror these implicational relations, proceeding through the universal feature hierarchy from the most general contrast to the rarest (e.g., first consonantal opposition is p:m and among the latest will be contrasts

between liquids). Characteristics of the child's system at any stage (e.g., phoneme frequency and assimilatory power, and substitutions) are also systematically related to the priority relationships within this hierarchy.

(The same view is also represented in:

1. R. Jakobson. 1939. 'The sound laws of child language and their place in general phonology." In R. Jakobson, Studies on Child Language and Aphasia, The Hague: Mouton, 1971, 7-20 [BALR, 85-82];

2. _____. 1959. 'Why "mama" and "papa"?' In B. Kaplan and S. Wagner (eds.), Perspectives in Psychological Theory. New York, [BALR, 213-217];

3. _____, C.G.M. Fant and M. Halle. 1952. Preliminaries to Speech Analysis: The Distinctive Features and Their Correlates. Cambridge: The M.I.T. Press.

4. _____ and M. Halle. 1956. Fundamentals of Language. The Hague: Mouton [Ch. 4- BALR, 218-227].)

4. Leopold, Werner. 1947. Speech Development of a Bilingual Child: A Linguist's Record. Volume 2: Sound learning in the first two years. Evanston: Northwestern University.

Continually cited, and also re-analyzed, by other writers, this exhaustively detailed diary study covers the English/German acquisition for the author's daughter Hildegard (footnotes contain relevant features of the second daughter's development). The second volume (in this 4-volume series on her language development) contains: (1) complete (cross-classified) phonetic descriptions (through 1;11); (2) several analyses (e.g., of the sounds as a system and also as related to the adult system (through substitutions) of phonetic processes which affect individual sounds (e.g., assimilation, reduplication, homonymy, etc.); and of suprasegmental features); (3) general discussion discussion, including all words and babbling forms. (See Volume I for total vocabulary, alphabetized by phonetic spelling, indexed and also chronologically presented.)

(For data summary and analysis, with detailed discussion of Jakobson, see: W.F. Leopold. 1953. 'Patterning in children's language learning.' Language Learning 5.1-14, BALR, 135-141.)

5. Pačesová, J. 1968. The development of vocabulary in the child. Brno, Czechoslovakia: University J.E. Purkyns.

The first 50, 100 and 500 (spontaneous) words of one Czech boy (0;10-1;12) are statistically analyzed for frequencies and distributions of all sounds (and variants). The phonemic interpretation

of the statistics is questionable (due to the inclusion of onomatopoetic, interjectional and other peripheral forms in the tabulations for phonemes), but text includes complete chronological corpus (phonetically transcribed). Discussion covers Jakobson's theory and frequent references to data of other Czech studies. (Data also on clusters, combinatory rules, prosody, syllable structure and syntax.)

(A shorter version of the conclusions is found in: J. Pačesová. 1972. 'The growth of phonemic repertory in Czech-speaking children.' In Karel Ohnesorg (ed.), 1972, Colloquium Paedolinguisticum. The Hague: Mouton.)

6. Smith, Neilson V. 1973. The Acquisition of Phonology, A Case Study. Cambridge: University Press.

Two corpora -- the author's son's productions at 2;2 and during 2;2 - 3;12 -- are analyzed: first as systems mapped from adult forms (child's competence is the adult surface phonemic form); and second as autonomous systems (competence is roughly equivalent to performance). Results argue for an acquisition theory closely associated with first analysis. ("Puzzles," metathesis and rule exceptions are main evidence countering the second.) In this view, the child has an internalized lexical representation equivalent to the adult's form; realization rules (e.g., cluster reduction, consonant harmony) relate these to his own output. Implications for generative phonology and general linguistic theory are discussed. Appendix C contains systematized diachronic lexicon.

7. Weir, Ruth H. 1962. Language in the Crib. The Hague: Mouton.

This study reports on 19 pre-sleep monologues of the author's son (2;4-2;6, American-English). Detailed analyses cover (1) (statistical) frequency and distribution of consonant and vowel phonemes (plus variants), phoneme classes and consonant clusters, (2) prosody and (3) phonemic shapes of words. Discussion includes references to Jakobson, Leopold, Grégoire, Ohnesorg and Templin. Appendix contains the complete chronological corpus in phonetic transcription (no gloss).

(Additional topics: morphology, syntax, vocabulary, discourse analysis, inner speech)

ARTICLES

8. Atkinson-King, Kay. 1973. "Children's acquisition of phonological stress contrasts," UCLA Working Papers in Phonetics, No. 25 (January 1973) 162 pp.

This study uses a multi-dimensional design (8 tasks) to test several components of a skill (300 subjects, aged 5-13). For noun

compounds and noun phrases, the author found that ability with unemphatic stress patterns (which distinguish meaning) is learned gradually (as a function of age) and late (by age 12); difficulty may be due to interference from (earlier acquired) contrastive stress. Individual variation and some sex differences occur. The order of mastery is imitation, comprehension and finally production.

9. Braine, Martin D.S. 1973. On what might constitute a learnable phonology. Ms. 75pp. (To appear in Language 50.2 (June 1974)).

Using (English) data from his son (1;3-2;2) and Velten's subject, the author presents his acquisition theory and its implications for concreteness in generative phonology. Theory claims the child begins with 'auditory gestalts' and successively masters articulatory features. Two learning processes (reflecting rule-levels in phonology) are posited: (1) Earliest stages are characterized by physical maturation of abilities and the 'unlearning' of 'primitive' articulatory habits (c.f. Stampe 1969); these processes reflect the 'filtering' of lexical representations at the lowest level (on articulatory features). (2) Later stages are characterized by pattern-learning processes involved in the acquisition of syntax; this higher level involves processes of abstraction filtering phonological segments.

10. Burling, Robbins. 1959. "Language development of a Garo and English speaking child." Word 15. 45-68. [BALR, 170-185; FSR, 69-90]

This study, one of the few dealing with a non-Indo-European language, reports on the language development of author's son (1;4-2;8). Analysis details acquisition order and substitution patterns for phonemes (little phonetic description), and describes position, features, syllables (e.g., reduplication), use of suprasegmentals (e.g., as an early strategy for contrast) and some general developmental processes. Discussion includes a favorable comparison of data with Jakobson's theory and some comments on points in Velten and Leopold.

(Additional topics: morphology and syntax; semantics; bilingualism.)

11. Chao, Yuen Ren. 1951. "The Cantian idolect: an analysis of the Chinese spoken by a twenty-eight-months-old child." University of California Publications in Semitic Philology 11. 27-44. [BALR, 116-130; FSR, 13-33]

One of the few on tonal languages, this study of Mandarin Chinese presents phonemic and phonetic features of one child's system (at 2;4). (FSR includes helpful sketch of Chinese phonology.) Results include non-adult features of child's system (e.g., collapsed contrasts, proclitic syllables), and elements both typical and atypical

of Chinese acquisition (e.g., early acquisition of tones of stressed syllables and absence of dental-for-velar substitutes, respectively).

(Additional topics: grammar and vocabulary.)

12. Cruttenden, Alan. 1970. A phonetic study of babbling. British Journal of Disorders of Communication 5.2. 110-117.

Monthly recordings (0;3-1;3) of the author's twin daughters were made. Findings contradict common assertions about babbling and its relationship to speech. Data indicate less phonetic range in babbling than assumed (not all English sounds, nor many non-English sounds occurred). The presumed discontinuity may not be definite (some evidence of drift toward English). Prosody, phonology of first words and imitation are discussed.

(Also see: 1. Ben G. Blount. 1970. "The pre-linguistic system of Luo children." Anthropological Linguistics 12. 326-342;

2. Arthur W. Lynip. 1951. "The use of magnetic devices in the collection and analysis of the preverbal utterances." Genetic Psychology Monographs 44. 221-262.)

13. Crystal, David. 1973. "Non-segmental phonology in language acquisition: a review of the issues." Lingua 32. 1-45.

After briefly discussing the methodological and theoretical problems in intonation and other non-segmental phenomena (including the general terminological confusion), the author critically reviews the early research (dating from 1876) and recent analyses of vocalization, and those of patterning in older children (1;64). Concluding that years of research have produced few results, author suggests types of normative data and descriptive frameworks needed for future research. An extensive bibliography (± 250 entries) is included.

14. Eimas, Peter D., Einar R. Siqueland, Peter Jusczyk and James Vigorito. 1971. "Speech perception in infants." Science 171. 303-306.

Using synthetic speech sounds varying along the voice dimension (/p/ vs. /b/), authors found that 1- and 4-month old infants respond to speech sounds and are able to make fine discriminations similar to the categorical perception of adults. Data is interpreted as evidence for the biological basis of speech.

15. Ferguson, Charles A. 1968. "Contrastive analysis and language development." Georgetown Monograph Series. 21. 101-112.

The author demonstrates the method of two types of contrastive analysis and discusses the nature of the information each can contribute

to the study of child language. The first contrasts three stages (at ages 1;0, 1;8 and 2;0) in one child's acquisition of French (a reanalysis of O. Bloch's 1913/1924 data). The second contrasts the adult system to the child's (H. Leopold's at 1;10), by using a model-and-replica analysis of substitutions.

16. Ferguson, Charles A. and Carol B. Farwell. 1973. "The development of initial consonantism in the acquisition of the first fifty words." Papers and Reports on Child Language Development, Stanford University, 6. 1-60. (To appear in Language.)

This article presents spontaneous and imitated data from 2 female subjects (0;11-1;2), tested 3-6 months, and uses Hildegard Leopold as comparison. From analysis of "phone classes," the authors argue for a lexical diffusior acquisition theory in which the lexical parameter, universal phonetic tendencies and individual differences play important roles.

17. Ingram, David. 1974. "Phonological rules in young children." Journal of Child Language 1. 00-00.

Form and function of phonological rules (i.e., organizing and generalizing processes) are discussed. Sample derivations from (9) children (1;3-2;2) learning English, French, and Czech illustrate cluster reduction, reduplication, diminutive, weak syllable deletion, voicing and assimilation. Author argues for an acquisition model in which perceptual errors and the operation of phonological rules (and subsitution rules) on underlying forms cause the discrepancy between child and adult systems.

18. Kornfeld, J.R. 1971. "Theoretical issues in child phonology." Papers for the 7th Regional Meeting of the Chicago Linguistic Society. 7. 454-468.

The author compares 2 competing hypotheses: H_1 basically states children perceive adult distinctions, but produce imperfectly (e.g., Smith 1970/73; Moskowitz 1970/71); H_2 claims children's limited perceptions account for most production differences. In arguing for H_2, author presents spectrographic analyses of clusters (from 13 English subjects, 1;6-2;6): unique child productions (e.g., conflation of adult features) are interpreted as evidence of perceptual selectivity.

19. Menyuk, Paula. 1968. "The role of distinctive features in children's acquisition of phonology." Journal of Speech and Hearing Research 11. 138-146. [FSR, 44-52]

The author briefly describes (1) productions of American (age 2-6) and Japanese (age 1-3) children, (2) substitutions of normal (age 3-7) and deviant (age 3-12) children, and (3) perceptual confusions

of adults. Features used are +nasal, +grave, +voice, +diffuse, +continuant, and +strident (listed in the developmental order for (1) above). Contradictory data may suggest features function differently in perception and production.

20. Messer, Stanley. 1967. "Implicit phonology in children." Journal of Verbal Learning and Verbal Behavior 6. 609-613.

With 25 monosyllabic pairs contrasting possible (PE) versus impossible (IE) English consonant clusters, the author obtained discrimination judgments and imitations from 20 children (mean age 3;7). Subjets generally preferred PE and mispronounced IE (91% of the substitutions toward PE). Data suggest children acquire some sequencing rules before age 4. (No data on order and processes of rule acquisition.)

(See also: Lise Menn. 1971. "phonotactic rules in beginning speech." Lingua 26. 225-251.)

21. Moskowitz, Breyene Arlene. 1970. "The two-year-old stage in the acquisition of English phonology. Language 46. 426-441. [FSR, 52-69]

Using data from 3 subjects, the author demonstrates the complexity of acquisition and the failure of strictly segmental or feature analyses to reveal this. An adequate approach (and its associated theory) must allow for alternatives: roles for features, segments and rule structures; differential learning (possibly related to marking conventions); universal versus language idiosyncratic phenomena; diversity in children's creativity; phonetic (pronunciation) versus phonological (system) levels of acquisition.

22. Moskowitz, Breyne Arlene. 1973. "On the status of vowel shift in English phonology." In T. Moore (ed.) Cognitive Development and the Acquisition of Language, New York: Academic Press, pp. 223-260.

An experiment was undertaken to determine the psychological reality of Chomsky/Halle SPE vowel shift rule. Results from 38 subjects, aged 5, 7 and 9-12, indicate children do not operate with SPE generalization, but do have knowledge of vowel shift rules which results from familiarity with the English spelling system. Data cast doubt on SPE formulation as a model of English phonology.

23. Olmsted, David L. 1966. "A theory of the child's learning of phonology." Language 42. 531-535. [BALR, 360-364]

Based on Mowrer's S-R learning model, this theory relates the acquisition order of consonantal phones to an acoustic discriminability ranking (based on adult confusions): voicing and nasality, the most discriminable, are learned first; friction and duration next; place

of articulation last. Crucial assumptions concern the equivalence of adult and child perceptual structures, the importance of frequency and the role of feedback and recall in improving production.

(The same view, with the author's experimental data, is found in D. L. Olmsted. 1971. Out of the Mouth of Babes. The Hague: Mouton.)

24. Read, Charles. 1971. "Preschool children's knowledge of English phonology." Harvard Educational Review 41. 1-34.

Evidence for children's systematic abstract representation of phonetic contrasts is derived from similarities in spelling systems invented by an unspecified number of preschool children (3;6-5) and spelling errors of children in early grades. Spelling relationships include tense/lax vowels (but not vowel shift rule alternations) paired together, /tr/ and /dr/ as affricates and intervocalic flaps as d.

25. Shvachkin, N. Kh. 1948. "The development of phonemic speech perception." Izvestiya Akad. Pedag. Nauk RSFSR 12. 101-132. (Translated by Elena Dernbach.) [FSR, 91-127]

This study, the broadest and most complete in the perception literature, discusses phonology within the context of the child's developing semantic system, and reports on an experiment (19 Russian S's, 0;10-2;0) which reveals an ontogenetic sequence of 12 stages. Similarities between this sequence and Jakobson's (independently determined) theory may suggest universals; contradictory data (possibly indicating language-specific influences) include early palatalization and inter-liquid discrimination, and late discrimination of stop-spirant (and voiced-voiceless) contrasts. FSR preface contains sketch of Russian phonology.)

(See also: Louella W. Graham and Arthur S. House. 1971. "Phonological oppositions in children: a perceptual study." JASA 49. 559-566.

26. Stampe, David. 1969. "The acquisition of phonetic representation." Papers from the Fifth Regional Meeting of the Chicago Linguistic Society. 5. 443-454.

This article summarizes the author's 'natural phonology' theory for acquisition. The child constructs an 'abstract phonological representation' from (and closely resembling) the adult phonetic form. His phonetically simplified productions result from the operation of 'innate processes' [neutralization rules] on these underlying representations; mechanisms of suppression, limitation and ordering resolve conflicting processes. As the child learns a new phonetic opposition, he uses one of these mechanisms to revise the innate system: by successively restricting innate processes, the child

increases possible phonetic contrasts and production improves toward the adult standard.

(Additional topics: role of acquisition in historical change; criticism of Jakobson.)

(See also: 1. Mary L. Edwards. 1971. "One child's acquisition of English liquids." Papers and Reports on Child Language Development, Stanford University, 101-109;

2. Patricia Donegan Miller. 1972. "Some context free processes affecting vowels." Working Papers in Linguistics, Ohio State University, 11. 136-167.)

27. Velten, H.V. 1943. "The growth of phonemic and lexical patterns in infant language." Language 19. 281-292 [BALR, 82-91]

In traditional phonemic terms, the author details his daughter's acquisition of English (from 0;11-3;0). The acquisition order and variants are recorded for all phonemes, by position; substitution data are particularly salient for liquids. Data are viewed as supporting Jakobson's theory if the opposition p:m is reformulated as stop: continuant (m or f). Developmental processes are noted, such as: (1) the uneven spread of a new canonical form through the lexicon (first examples being "loan words," last to change being frozen forms, the high frequency, early acquired words); (2) the use of a distinctive vowel length as a voicing strategy.

(Additional topic: stages of vocabulary acquisition)

28. Waterson, Natalie. 1971. "Child phonology: a prosodic view." Journal of Linguistics 7. 179-211.

Using a non-segmental, feature analysis on 21 of her son's 155 (English) words (at 1;6), the author groups the child's forms into 5 different structures, each characterized by a set of basic phonetic features: Labial; Continuant; Sibilant; Stop; and Nasal. Using prosodic analysis (in the Firthian tradition), the author shows these features to be subset of those found in the corresponding sets of adult forms. An early acquisition model is detailed which emphasizes holistic perceptions, and productions composed of the most perceptually salient phonetic features (which in turn function as schemata for subsequent forms); development proceeds toward finer distinctions and differentiation of combinations and sequences (no universal order).

29. Winitz, Harris, and Orvis C. Irwin. 1958. "Syllabic and phonetic structure of infants' early words." Journal of Speech and Hearing Research 1. 250-256. [FSR, 34-44]

Statistical analyses are reported for early words for 93(?) subjects (1;1-1;6). One main finding is that first words words are usually

mono- or di-syllabic (with frequent reduplication). The frequency statistics of sounds are based on 'phonemes,' which are distinguishable sound types not directly related to phonological units.

(A similar S-R behaviorist approach with modification is found in: Harris Winitz. 1969. Articulatory Acquisition and Behavior. New York: Appleton Century Crofts.)